International Journal of Industrial and Manufacturing Engineering
Vol:8, No:2, 2014

Evaluating Residual Mechanical and Physical Properties of Concrete at Elevated Temperatures

Authors : S. Hachemi, A. Ounis, S. Chabi

Abstract : This paper presents the results of an experimental study on the effects of elevated temperature on compressive and flexural strength of Normal Strength Concrete (NSC), High Strength Concrete (HSC) and High Performance Concrete (HPC). In addition, the specimen mass and volume were measured before and after heating in order to determine the loss of mass and volume during the test. In terms of non-destructive measurement, ultrasonic pulse velocity test was proposed as a promising initial inspection method for fire damaged concrete structure. 100 Cube specimens for three grades of concrete were prepared and heated at a rate of 3°C/min up to different temperatures (150, 250, 400, 600, and 900°C). The results show a loss of compressive and flexural strength for all the concretes heated to temperature exceeding 400°C. The results also revealed that mass and density of the specimen significantly reduced with an increase in temperature.

Keywords : high temperature, compressive strength, mass loss, ultrasonic pulse velocity
Conference Title : ICIEM 2014 : International Conference on Industrial Engineering and Management
Conference Location : Barcelona, Spain
Conference Dates : February 27-28, 2014